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MODULATION SYSTEM OF STEAM HEATING

IN THE

SUMNER APARTMENTS

NEWTON CENTRE, MASS.



SUMNER APARTMENTS

WARREN WEBSTER & CO.

CAMDEN, NEW JERSEY

WEBSTER MODULATION

Steam Heating System in the Sumner Apartments.

Newton Centre, Mass.

The Webster Modulation System of Steam Heating which has been applied so successfully to office buildings and similar structures has recently entered the field of apartment house heating. The steam heating troubles which have always been more or less prominent in apartment houses have often militated against the many advantages of this type of dwelling. Hot water systems, particularly in New England, have proven unsatisfactory on the whole because of the sluggishness of circulation and the fact that with the exceedingly rapid temperature changes peculiar to this climate, it is almost impossible to attain satisfactory control of the heating. Plain steam heating, on the other hand, adapts itself readily to temperature changes, and smaller pipes and radiators can be used than is the case with hot water. But this system with its ordinary valves has important drawbacks.

In many sections the majority of apartment house steam systems are two pipe, a type which has some advantages over the simpler one pipe system. A hand valve at the inlet end of the radiator and a similar valve on the return end must be manipulated in an attempt to regulate the heat given off. With a system having plain valves it is impossible to set them so that only a part of the radiator surface is in action. Both valves must be wide open or shut tight, otherwise water hammer and various similar troubles will develop. Accordingly, if the steam is on, the entire radiator is at a temperature of 212 degrees or thereabout, and if the valves are closed, the radiator rapidly cools and the apartment soon becomes chilly. To overcome these difficulties and at the same time retain all the advantages of the quick action of steam, the Modulation System of Steam Heating was designed by Warren Webster & Co., Camden, N. J.

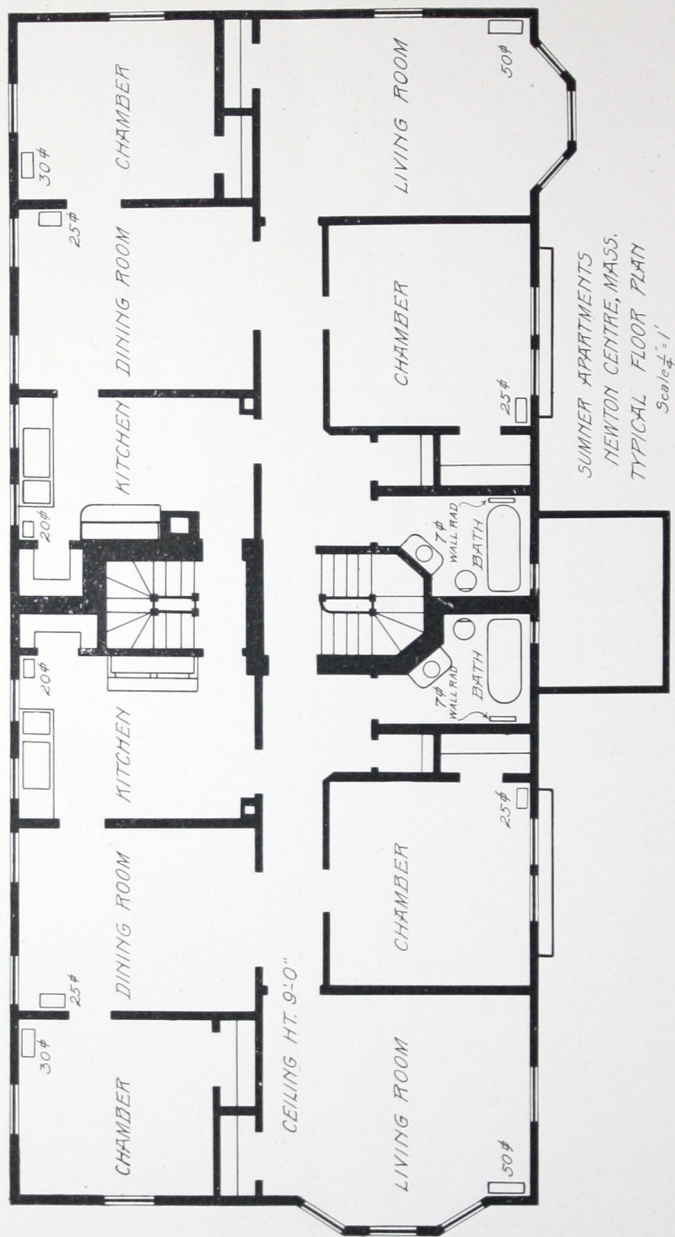
By means of an automatic discharge trap on the return end of the radiator combined with a fractional inlet valve it is possible to vary the amount of radiator surface in action without backing up of the condensation and consequent noises and other disagreeable manifestations from the radiator. The Webster Water Seal Motor or discharge trap is entirely automatic and therefore, although this is a two-pipe system, only one hand-operated valve at each radiator is necessary. The automatic return valve or trap discharges the condensed

steam and air to the return line but prevents steam from passing so that the amount of steam admitted to the radiator and therefore the proportion of surface in action, may be regulated entirely by setting the Modulation Valve. The latter is designed so that less than a full turn of the valve handle opens the valve wide and a pointer moving over a graduated scale indicates the actual extent of the valve opening. An added convenience is the placing of this control valve at the top of the radiator so that it is not necessary to bend over and grope near the floor to find the valve handle.

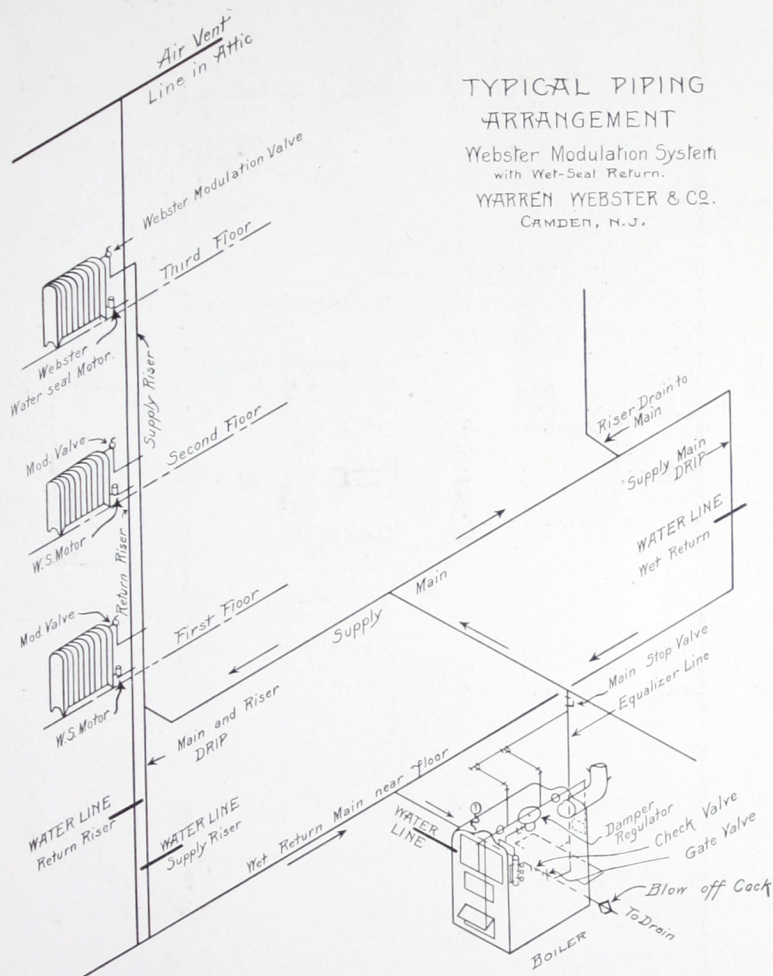
This heating system as installed in the Sumner Apartments at Newton Centre, Mass., is exceedingly simple, both in design and operation. Although not a vacuum system, it operates perfectly on a pound or less boiler pressure, because the sealing of the radiator returns in the manner indicated insures a differential pressure between the inlet and discharge of each radiator, and therefore a positive flow.

The building is three stories and basement with two five-room apartments on each floor. The basement contains beside the heating plant and storerooms, living rooms for the janitor and provision for additional servant's bedrooms. In the northwest corner of the basement is the heating plant consisting of a No. 870 Mott Sunray boiler with a grate 32 x 40". Near the boiler is the hot water service heater connected with a large hot water storage tank. From the boiler a steam main runs across the basement and connects with a steam header located at either side. Four risers are taken off each header. These run the full height of the building to the third floor and the return lines are joined in the attic by a $\frac{3}{4}$ " ring header which serves as a vent line to the atmosphere. The arrangement of one typical riser and return is shown in the accompanying isometric. The method of piping as used in this particular installation is what is known as a wet return system.

As the steam lines are under a slight pressure and the returns are vented to the atmosphere in the manner described, the water line in the returns is necessarily somewhat higher than in the supply lines and in the boiler. All the return risers are carried down below this return water line and in this manner are all sealed. Each supply riser and the supply mains are dripped back to the wet return main near the floor. An equalizer line connects the supply main and the wet return main at the boiler and provides for the removal of any water of condensation from the main. A Webster automatic damper regulator prevents the steam pressure from rising abnormally and the boiler is also supplied with a ten-pound pop safety valve. A compound gauge for indicating the boiler steam pressure is also furnished. There is a Webster special check valve in the return near the boiler.



The total radiating surface in this building is 1117 sq. ft. and the cost of installing the Modulation System was only slightly greater than that of a plain gravity system. The system has now been operating one winter and has proved exceedingly satisfactory. Not only has its operation been noiseless



and the extent of the radiating surface easily controllable in each room, but a decided saving in coal has also been made possible. As proven in a recent test at Montreal, Canada, on the operation of the Webster Modulation System, its action is such that the amount of coal burned grows less as the outdoor temperature rises and vice versa. This is, of course, the logical way for any

heating system to operate, but it is not attained in actual practice with the plain gravity system because of the inability to regulate the average radiator temperature with plain valves. The many comforts and conveniences of apartment house life are added to very materially by the introduction of this system by which exactly the right amount of heat can be obtained at all times without any of the annoyances common to ordinary steam heating systems.

The natural effort of designers of this class of building is toward the elimination of every possible disturbance. Where many families live in close proximity to each other as in the case of the modern apartment house, isolation of each apartment is most desirable. Sound-proof walls and floors have done much toward making tenants comfortable, but shutting off the sounds from neighboring rooms is of little use if the heating apparatus is likely to set up a disagreeable racket at any time. This annoyance has been borne in the past with the feeling that it was an inevitable part of steam heating. The successful application of the noiseless Modulation System to apartment house heating, however, points an easy way to the final elimination of the nuisance.

The architect of the Sumner Apartments was E. B. Stratton, of Boston. The heating installation was designed by and installed under the direction of the New England branch of Warren Webster & Company, Camden, N. J.